Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
Revisions of Part 2 and 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) devices in the 5 GHz band	)	ET Docket No. 03-122 RM - 10371

REPLY COMMENTS OF CISCO SYSTEMS, INC.

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23 September 2003

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The comments in this proceeding reflect a broad industry consensus that the Commission's proposals in its Notice of Proposed Rulemaking[1] are largely on target. The Commission should now swiftly adopt its primary proposals. Minor adjustments are needed, however, to the Commission's subsidiary proposals. Most importantly, the Commission should not codify any additional technical restrictions until compliance testing procedures for DFS equipped devices are developed, and should link the compliance transition period for DFS equipped devices to the adoption of those testing procedures.

Discussion

I. The Commission Should Adopt Its Spectrum Use Proposals

No issue drew more attention or debate at the 2003 World Radiocommunication Conference ("WRC-03") than the proposal to allocate spectrum at 5 GHz for radio local area networks (RLANs). After four weeks of intense debate, the entire world – led by the

[1] *See Revision of Parts 2 and 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*, *Notice of Proposed Rulemaking*, 18 FCC Rcd. 11581 at ¶13 (rel. June 4, 2003) ("NPRM").

United States – agreed to the allocation proposal. The spectrum use proposals made by the Commission in this proceeding accurately reflect the position taken by the United States at WRC-03 and are consistent with its outcome.[2] Virtually all commenters have agreed that the decision whether to adopt these proposals is an easy one: the Commission should just do it.[3] A contrary decision would adversely affect the increasingly rapid growth of wireless broadband networks, create difficulties for government agencies using the 5 GHz band, and significantly undermine U.S. credibility on spectrum issues globally.

II. The Commission Should Adopt Its Proposed Changes to the U-NII Rules with Only Minor Adjustments

A. Dynamic Frequency Selection and Transmit Power Control

Cisco, like most other commenters, supports the proposal to require devices operating in the newly designated U-NII spectrum at 5 GHz to incorporate dynamic frequency selection ("DFS") and transmit power control ("TPC").[4] These techniques are essential for sharing the 5.470-5.725 GHz band among U-NII devices and other services.[5] Cisco also continues to support applying the technical rules from the 5.250-5.350 GHz band to the 5.475-5.725 GHz band.

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2 *See NPRM,* 18 FCC Rcd. 11581 at ¶¶ 12, 13 and at Table 1. Though, unlike the Resolution adopted by WRC-03, the Commission does not propose a "formal" allocation for U-NII devices in the 5.470-5.725 GHz band (preferring instead its traditional approach to "unlicensed" spectrum), the practical effect the Commission's 5 GHz allocation proposals would be to create a domestic spectrum landscape that mirrors the WRC-03 decision.

3 Those urging adoption of the allocation proposals include: Microsoft, Intel, Motorola, Atheros, Agere, IEEE, TIA, Wi-Fi Alliance, American Petroleum Institute, TowerStream Corp., the License-Exempt Alliance, Advanced Micro Devices and the Information Technology Council.

4 *See* Comments of Cisco (filed September 23, 2003) at 6.

5 Cisco also supports the imposition of the DFS requirement in the existing 5.250-5.350 GHz U-NII band. But like the Commission, it believes that when multiple devices are under the direction of a central controller, only the central controller should be required to have DFS. *See* Cisco Comments at 5 and *NPRM*, 18 FCC Rcd. 11581 at ¶22.

Beyond these requirements, however, the Commission should proceed cautiously. There is a clear industry consensus that the Commission should not codify technical parameters beyond those already identified for DFS,[6] and the simple requirement that TPC be implemented. In particular, for DFS, the Commission should not attempt to specify the minimum number of radar pulses, the observation time required for the detection of radar signals, or a bandwidth correction factor for U-NII devices with a receive bandwidth less than 1 MHz.[7] Nor should it mandate algorithms and architectures to implement TPC as these may be device specific and are best left to circuit and system designers.

As the Commission knows, NTIA is leading an open process, bringing together interested parties from both government and industry, to develop compliance testing procedures that will ensure future U-NII devices meet the Commission's proposed DFS requirements. If codification of additional DFS parameters is necessary at all, such action should await the outcome of that work.[8]

Moreover, Cisco and most other commenters believe that for TPC it is unnecessary to specify anything beyond a general requirement that the technique be used for devices with an EIRP of 500 mW or more.[9] The U.S. effort to model U-NII (or RLAN) radar compatibility in preparation for WRC-03 was based on the use of DFS to

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6 Some parties have submitted comments suggesting that DFS-related definitions be clarified to distinguish between dynamic frequency selection (a mechanism) and radar detection (an action). *See* Motorola Comments at 5 and Wi-Fi Alliance Comments at 6. Cisco supports clarifying these definitions where appropriate.

7 Indeed, Cisco and others believe that the U-NII rules should encourage wideband devices, i.e., bandwidths equal to or greater than 1 MHz, and that it should not adopt special rules that would encourage the use of narrowband devices.

8 Cisco Comments at 6. *See also* Motorola Comments at 6 and footnote 10.

9 *See, e.g.,* Agere Comments at ¶ 17, Atheros Comments at 5, Motorola Comments at 9 and Wi-Fi Alliance Comments at 10.

detect radar signals and TPC to yield a statistical average 3 dB drop in the "RLAN power environment" as viewed by a radar. This modeling assumed an RLAN EIRP of 1 watt. So long as the radar "sees" an average 3 dB power drop, whether by devices employing TPC and operating between 500 mW EIRP and one watt EIRP, or by devices with no TPC and an EIRP of 500 mW or less, the effect the Commission is seeking will be accomplished. How a particular device implements TPC is immaterial, and devices that generate 500 mW or less simply do not need TPC to contribute to the 3 dB power drop.

B. Other Technical Requirements

Cisco and most commenting parties support the Commission's proposal to apply in the 5.470-5.725 GHz band the same U-NII technical rules that now apply in the 5.250-5.350 GHz band. Indeed, the U.S. government and U.S. industry supported this proposal both in regional meetings leading to WRC-03 and at WRC-03. As Cisco and a number of other commenters have noted, however, there are several non-technical regulations that needlessly burden the 5.250-5.350 GHz band and that should not applied to the 5.470-5.725 GHz band.[10] Indeed, these rules should be abandoned altogether.

III. The Commission Should Await the Results of the NTIA Process Before Adopting Compliance Test Rules and Transition Dates

The NTIA effort to work with industry and government agencies to develop DFS testing procedures is a multi-stage process. First, the participants must determine what parameters should be tested to ensure that DFS requirements are met. Second, they must design a suitable laboratory test plan that is thorough – yet not overly burdensome to those who ultimately must check for compliance. Third, the participants must conduct

[10] *See* Cisco Comments at 11.

field tests to verify the validity of the laboratory test plan.[11] Once the process is complete, it will ensure that DFS "works as advertised" – which is critical for government spectrum users – and will provide device manufacturers real world data necessary to tweak their individual DFS implementations.

Unfortunately, this three-stage process will take time. It thus makes little sense for the Commission to adopt compliance testing procedures now. The same is true for the establishment of a deadline for the incorporation of DFS into U-NII devices. Obviously, it would make no sense to require companies to market DFS equipped devices before those devices can be certified and, of course, such devices cannot be certified until compliance testing procedures have been adopted. Thus, Cisco and many other manufacturers think it only makes sense to link the transition deadlines to adoption of testing and compliance procedures.[12]

Cisco believes, therefore, that the Commission should complete this proceeding in two steps. First, it should promptly adopt the spectrum use and allocation proposals, the general DFS and TPC requirements, and the application of existing 5.250-5.350 GHz technical rules to the new U-NII band at 5.470-5.725 GHz. Second, it should issue a Further Notice on testing procedures and transition dates for DFS that will not require comments until the NTIA process has had time to progress. At that point, the Commission will have better information upon which to base a decision both on compliance procedures and transition dates.

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[11] Cisco and other manufacturers are now working to produce prototype devices that can be used for field-testing.

[12] *See, e.g.,* IEEE 802 Comments at 19, Agere Comments at ¶ 29, IceFyre Semiconductor, Inc. Comments at 2, TIA Comments at 4 and License-Exempt Alliance Comments at 7.

IV. The Commission Should Consider Adding the 5.825-5.925 GHz Band to the Existing 5.725 GHz-5.825 GHz High Power U-NII Band

Nothing in this NPRM stirred more controversy than the Commission's off-hand suggestion that the 100 MHz of spectrum now set aside for high power U-NII devices in 5.725-5.825 GHz band would be sufficient for point-to-point and point-to-multipoint broadband systems. Like most commenters interested in the growth of wireless broadband networks, Cisco thought the Commission simply had it wrong.[13] As Cisco noted, the current high power U-NII band provides only four non-overlapping channels for an 802.11-based system. It is most unlikely that this will be sufficient, particularly if the technology develops as is hoped in rural areas. Indeed, a number of commenters suggested that the Commission should allocate additional spectrum for high power U-NII operations.[14] Adding the upper adjacent 100 MHz of spectrum to the high-power U-NII band would provide for four more channels and would also relieve pressure on the lower U-NII bands. The Commission should consider adding the 5.825-5.925 GHz band to the existing high power U-NII band, either in a Further Notice of Proposed Rulemaking or another proceeding.

Conclusion

This Commission has not received nearly the credit it deserves for creating a regulatory environment in which broadband wireless systems can flourish. This is yet another in an increasingly long list of well-crafted proceedings designed to bring wireless broadband to more Americans in more places. Cisco now encourages the Commission

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13 Cisco Comments at 3.

14 See Comments of Motorola at 4, Comments of Proxim at 4 ("additional unlicensed spectrum for use by high power outdoor operations will be required in the next five years"), Comments of Microsoft at 9; Comments of IEEE 802 at 7, Reply Comments of Nextweb and the Wireless Bay Area Network Coordination Group at 2, 7.

promptly to adopt its primary proposals, and to postpone a handful of other issues until there is sufficient information to address them effectively.

Respectfully submitted,

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